CX – 37

An Investigation of Stream Channel Modifications at Unauthorized Suction Dredging Sites on the South Fork Clearwater River, October 7 and 8, 2015

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Introduction. The Nez Perce-Clearwater National Forests (Forests) and the Cottonwood Field Office of the Bureau of Land Management (BLM) share management responsibilities for much of the length of the South Fork Clearwater River (SFCR) from Harpster upstream. The Forests and BLM are currently engaged in efforts to authorize limited suction dredge mining in a 40+-mile reach of the SFCR for 2016 and future years. In 2015, however (and, to some extent, in previous years), miners suction-dredged several locations in the mainstem SFCR without authorization from the Forests or BLM. The Forests' Minerals Program Lead, Clint Hughes, investigated some of the mining activity on the SFCR on July 22, 2015 and compiled a report (Hughes 2015) detailing his findings.

The present report is a follow-up to the Hughes report in that most mining sites identified in that report were re-located and that evidence of mining activity at these sites was described, measured, and photographed. Neither the Hughes report nor this document purports to have identified all of the 2015 mining sites along the SFCR, and this report makes no effort at identifying the miners responsible for stream channel alterations.

Methods. I reviewed the Hughes report and attempted to locate all of the mining activity in the vicinity of the sites identified by Hughes (Figure 1). I visited and investigated most of the Hughes sites on October 7, 2015 with technicians Travis Bybee and Kevin Jackson, and we discovered evidence of recent dredging in proximity to most of these sites (Figure 1). Bybee and Jackson finished the surveys on October 8. The sites we identified and numbered (Figure 1, Table 1, Appendices A and B) by proximity often consisted of several suction dredging holes and tailings piles that could have been grouped differently, and do not imply any knowledge of the specific miner responsible for the stream channel alterations.

Our observations were primarily focused on location and measurements of the dredge holes and tailings piles, along with observations of streambank alterations, substantial accumulations of fine sediment, and presence of western pearlshell mussel (WPM).

We made observations at all of the sites at which we observed in-channel dredging operations. We did not conduct a foot survey of the entire Federally-managed portion of the SFCR, however, but much of the river is visible from Idaho 14, and we neither saw nor were informed of any other 2015 dredge sites. While it seems likely that other dredging operations existed on the river in 2015, but also seems unlikely that we missed a substantial number of these operations, particularly where placer mining seems to be concentrated (in the reach of the SFCR upstream of Newsome Creek.)

Results. We grouped our observations into 14 sites along about 4.5 miles of the SFCR stream channel (Figures 1 and 2, Table 1, Appendices A and B) between the confluences of Trail Creek and the Crooked River. Table 1 displays selected site information, and Appendix A additionally includes drawings of each of the individual sites, with selected photos and observations. Briefly, we documented 39 suction dredging holes and 36 piles of tailings, for a total of about 8,600 $feet^2$ of holes and about 13,700 $feet^2$ of tailings. Some of the dredge holes were more than 5 feet deep, with a total hole (= substrate excavation) volume of nearly 1,000 $yards^3$. Although the Hughes report noted suction dredging activity downstream of our lowermost site (Hughes Site #1) and upstream of the Crooked River (Hughes Site #9, on BLM-managed land), we did not detect any signs of dredging in these areas.

Discussion. Although the area of suction dredging impact in terms of dredge holes and tailings seems large, these observations of dredge holes and tailings piles account for only about ~0.6% and ~1.0%, respectively, of the wetted area of the ~4.5 mile reach in which we found evidence of 2015 suction dredging (assuming a mean wetted channel width of ~57 feet (Dobos 2015)). Even within the stream reach in which 11 of the 14 sites were distributed along only about 2,500 feet of the SFCR (Figure 2), dredging holes and tailings piles accounted for only about 4.4% of and 7.1%, respectively, of the wetted stream channel.

That said, the observed effects of the unauthorized dredging were profound at the site level, and many of the potential effects of the dredging on stream biota and habitat cannot be observed after the fact (for example, direct harm to ESA-listed or Sensitive organisms in the form of turbidity, effects on prey populations, migration delay, or exclusion from favorable habitat). In particular, live individual WPM were observed in tailings piles and in accumulated fines, and it is a reasonable assumption that some individuals were buried in the piles/fines and were smothered. In addition, it is possible that some of the holes/piles we observed were large enough or in specific locations such that subsequent high flows would alter the long-term morphology or stability of the current stream channel and banks.

Appendix B compares photos from dredging sites in July 2015 with those associated with this report. These photos demonstrate that additional dredge mining was performed at some of the sites between July and October, but also that existing holes and tailings piles were easily recognizable after a 2½-month low-flow period. The tailings piles, in particular, stood out visually because the relative lack of periphyton growth on the dredged and relocated substrate contrasted with the darker, relatively undisturbed surrounding substrate.

On the other hand, one of the assumptions regarding suction dredging is that annual or more frequent peak flows will mobilize bedload to the extent that dredge holes will be filled and tailings piles will be dissipated and difficult to discern within 9 months to a year. This observation has been generally upheld so far in the literature and at a suction dredging site on Moose Creek (on the North Fork Ranger District (Kenney 2014)).

The observations described in this report should be sufficient to allow the Forests to semi-quantitatively evaluate the assumption of channel morphology "reset" on the SFCR following 2016 peak flows and prior to or coincident with any authorized dredging in July-August 2016.

References

Dobos, M.E. 2015. Movement, distribution, and resource use of westslope cutthroat trout in the South Fork Clearwater River Basin. Master's Thesis, University of Idaho, Moscow. April 2015. 55 pp + appendices.

Hughes, C. 2015. Mineral inspection form, Nez Perce-Clearwater National Forests; Project: South Fork Clearwater dredges. July 22, 2015. 22 pp.

Kenney, D. 2014. Post-season suction dredging report for Moose Creek, Lolo Creek, and Orogrande Creek project areas. Nez Perce-Clearwater National Forests. December 31, 2014. 6 pp. + Appendices.

Figures 1 and 2, Table 1, and Appendices A and B on following pages.

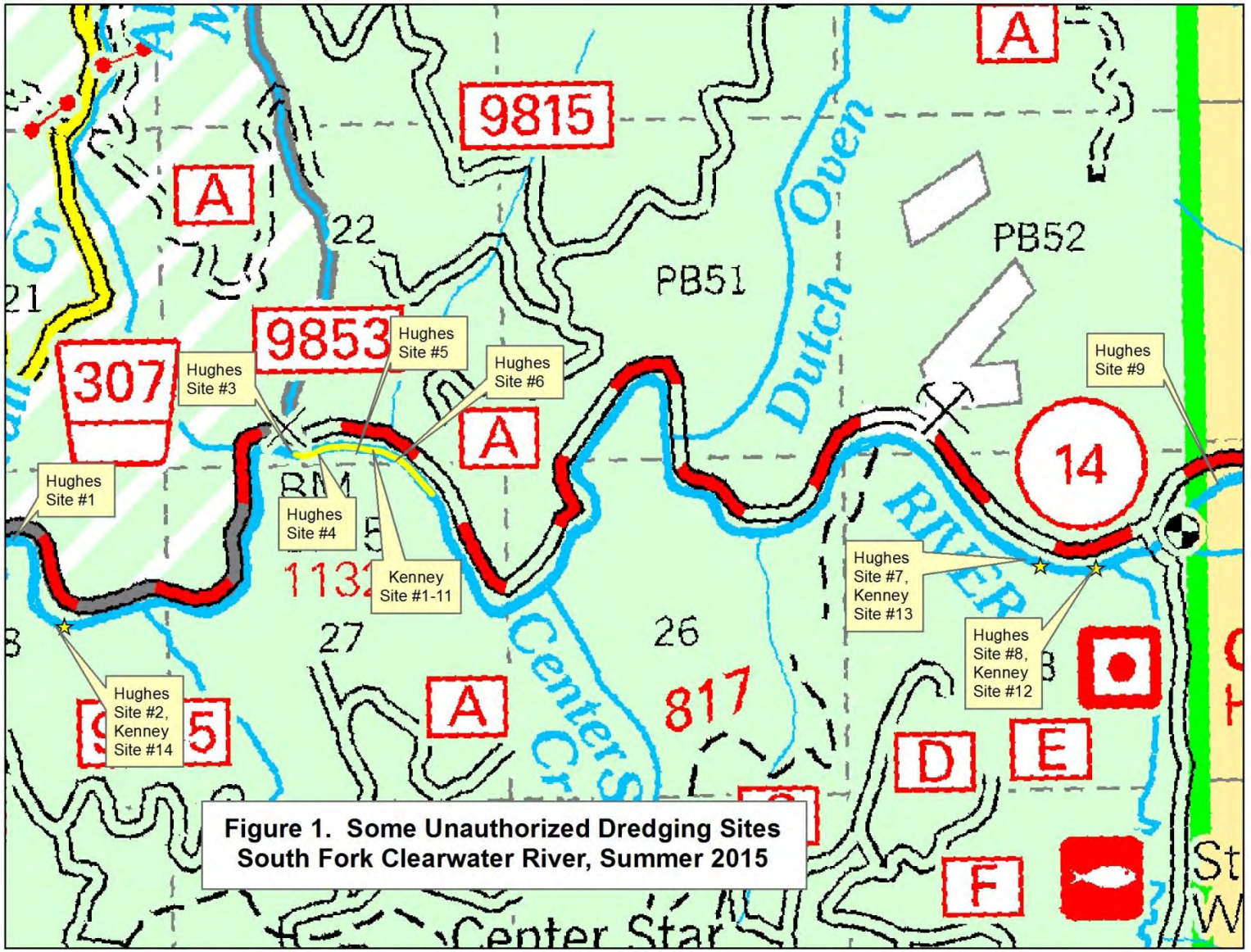


Figure 1. Some Unauthorized Dredging Sites South Fork Clearwater River, Summer 2015

Figure 1. Locations of July (Hughes, text box) and October (Kenney, text box and yellow stars) dredging site observations on the SFCR. Kenney Site #1-11 are too close together to show stars and so this reach is designated by a yellow line. The length of the SFCR reach between Hughes Site #1 and Hughes Site #8 is about 4.5 miles. The western edge of the Elk City township is on the far right.

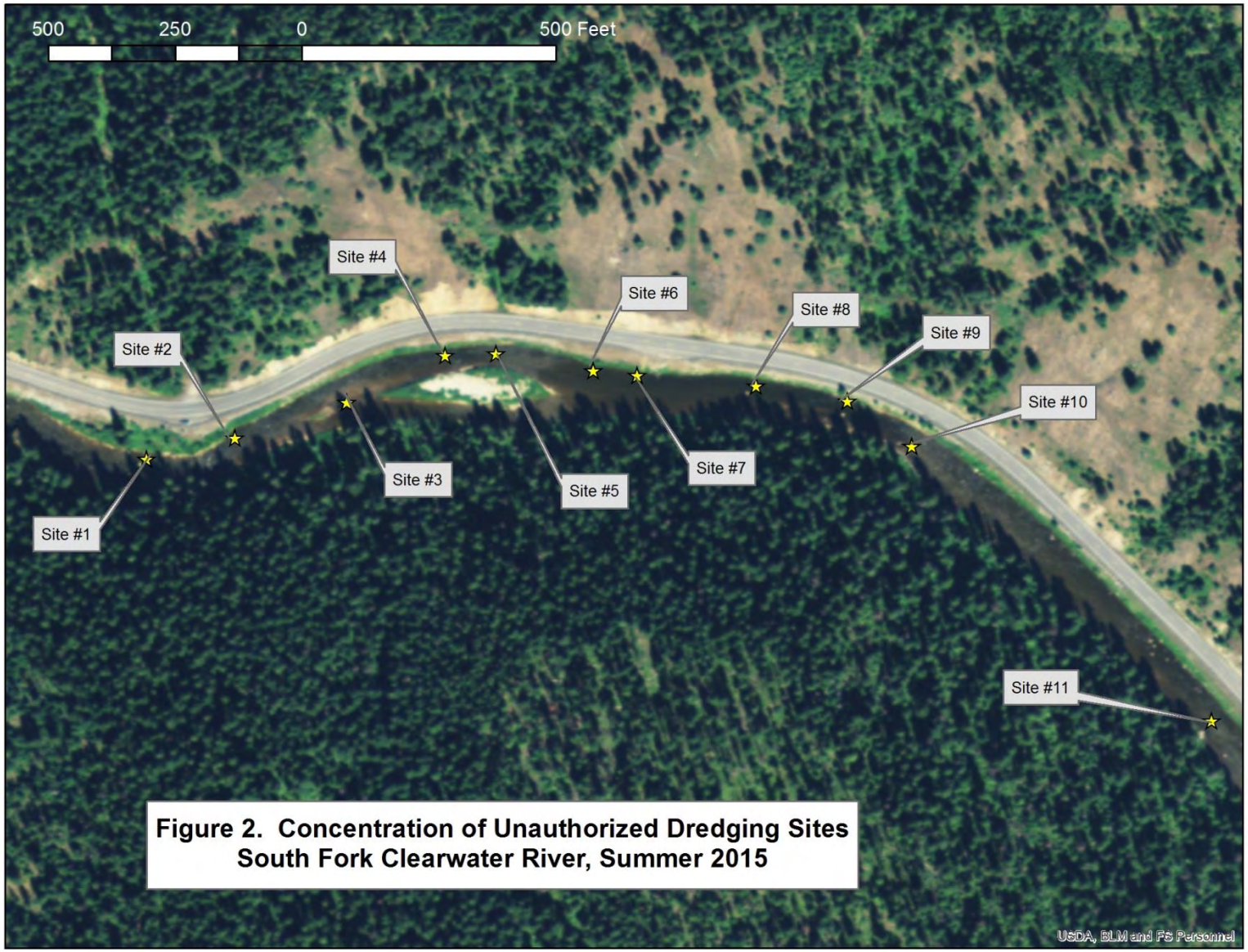


Figure 2. Aerial photo showing locations of concentrated area of October (Kenney, text box and yellow stars) dredging site observations on the SFCR; this figure shows the location of sites designated in Figure 1 by a yellow line. The stars show the upstream-most edge of the upper dredge hole for each site. The length of the SFCR reach between Site #1 and Site #11 is about 2,500 feet. Note proximity of Idaho 14 to river.

Site #	Survey Date	Easting	Northing	# Holes*	# Tailings Piles*	Excavation Area (ft^2)*	Excavation Volume (yd^3)*	Tailings Pile Area (ft^2)*
1	10/7/2015	610279	5076040	4	2	503	57	278
2	10/7/2015	610333	5076053	2	1	221	21	148
3	10/7/2015	610398	5076074	2	2	625	103	816
4	10/7/2015	610459	5076104	3	2	527	51	1,014
5	10/7/2015	610489	5076104	1	1	99	8	287
6	10/7/2015	610548	5076093	2	2	645	84	1,749
7	10/7/2015	610574	5076090	1	2	1,044	127	1,457
8	10/7/2015	610645	5076084	2	2	618	77	572
9	10/7/2015	610700	5076075	3	2	628	62	426
10	10/7/2015	610739	5076048	3	3	830	129	2,452
11	10/7/2015	610918	5075883	2	2	526	55	978
12	10/8/2015	614062	5075540	5	4	670	47	1,161
13	10/8/2015	613792	5075546	4	4	453	75	393
14	10/8/2015	609175	5075244	5	7	1,253	86	2,017
Total	**n/a**	**n/a**	**n/a**	**39**	**36**	**8,642**	**982**	**13,748**

Table 1. October 2015 site information. Dredge holes were fairly distinct, but tailings piles were less so, and so the counts and dimensions of these features are approximate. Only simple length, width, and depth measurements were taken, so hole and pile areas shown in this table were reduced by 20% in calculations because these features were typically more rounded than rectangular. In calculations of excavation volume, each measured hole depth was reduced by about 1 foot to account for existing stream channel depth and angle of repose of the dredge hole sides. Because of the described circumstances and adjustments, the estimates of area and volume shown here should be considered to be rough approximations.

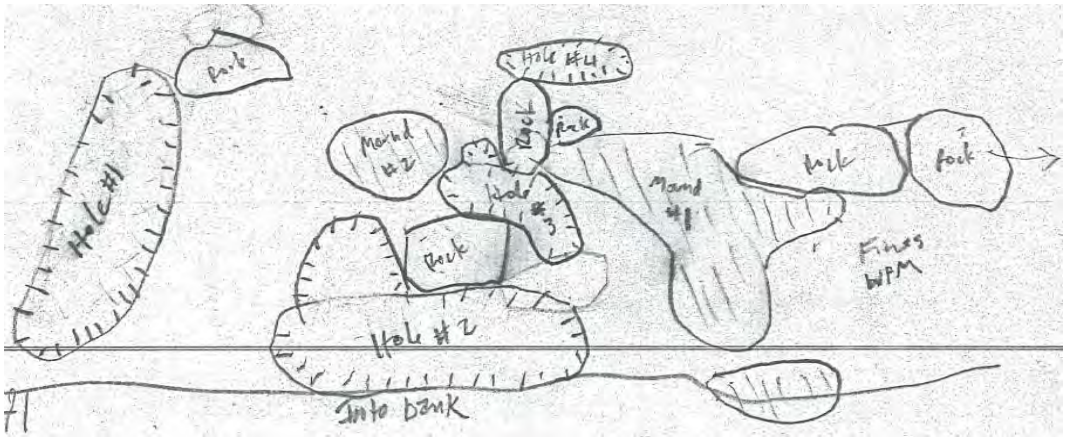
Appendix A.

SFCR Unauthorized Site #1, October 7, 2015

Upper feature location	Hughes Site?	Dredge Fines?	WPM?	Notes:
UTM 11 610279E, 5076040N	3	Yes	Yes	~10 ft of bank alteration just below Moose Ck confluence

	Length (m)	Width (m)	Depth (m)	Dredge Hole Totals	
Hole #1	5	2.8	1.7	Area: (m^2):	58
Hole #2	3.1	8.9	1.3	Adjusted Area (m^2):	47
Hole #3	3.2	4	0.8	Adj. Area (ft^2):	503
Hole #4	2.1	1.9	0.6	Adj Volume (yd^3)	57

	Length (m)	Width (m)	Dredge Tailings Totals	
Pile #1	7.2	4.3	Area: (m^2):	32
Pile #2	0.6	2.3	Adjusted Area (m^2):	26
	7.8	6.6	Adj. Area (ft^2):	278

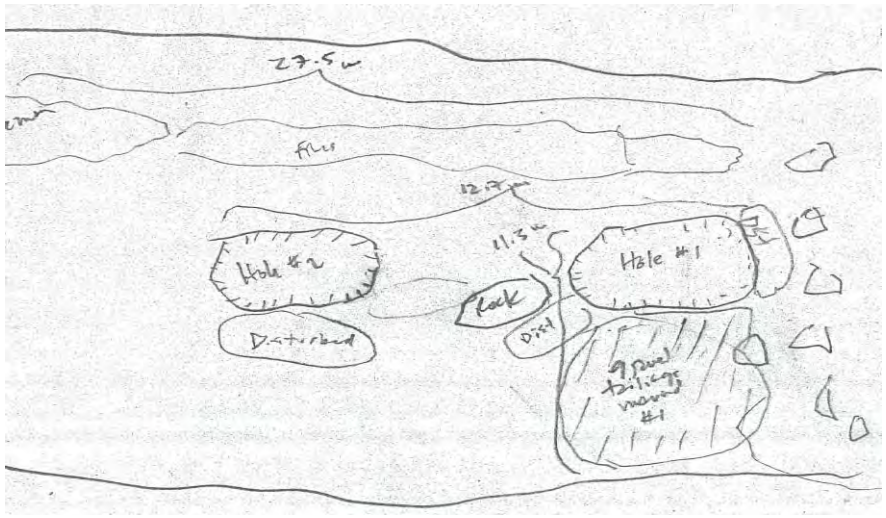


SFCR Unauthorized Site #2, October 7, 2015

Upper feature location	Hughes Site?	Dredge Fines?	WPM?	Notes:
UTM 11 610333E, 5076053N	3	Yes	Yes	n/a

	Length (m)	Width (m)	Depth (m)	Dredge Hole Totals	
Hole #1	3.1	4.3	0.8	Area: (m^2):	26
Hole #2	4	3.1	1.4	Adjusted Area (m^2):	21
				Adj. Area (ft^2):	221
				Adj Volume (yd^3)	21

	Length (m)	Width (m)	Dredge Tailings Totals	
Pile #1	2.2	7.8	Area: (m^2):	17
	2.2	7.8	Adjusted Area (m^2):	14
			Adj. Area (ft^2):	148

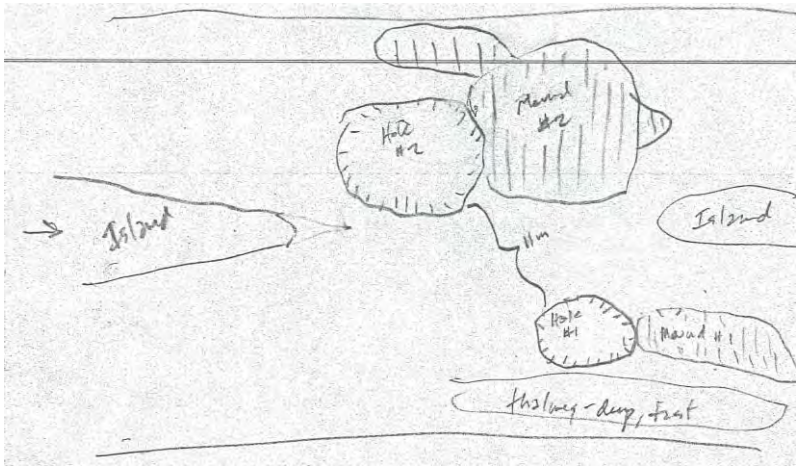


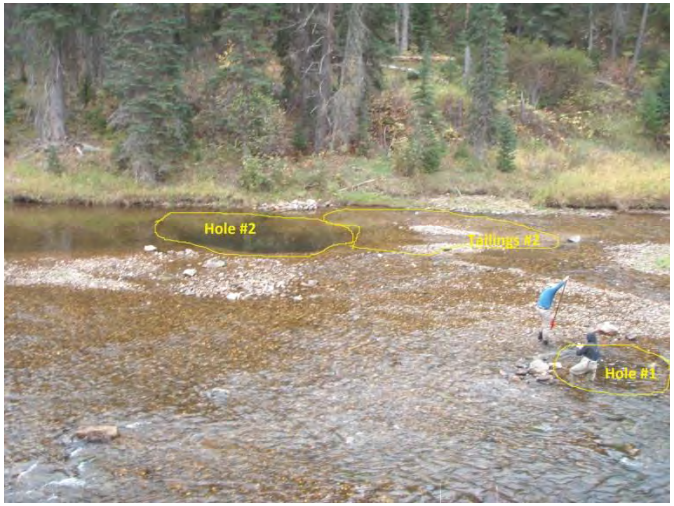
SFCR Unauthorized Site #3, October 7, 2015

Upper feature location	Hughes Site?	Dredge Fines?	WPM?	Notes:
UTM 11 610398E, 5076074N	4	Yes	No	n/a

	Length (m)	Width (m)	Depth (m)	Dredge Hole Totals	
Hole #1	4.6	2.9	1	Area: (m^2):	73
Hole #2	7.8	7.6	1.8	Adjusted Area (m^2):	58
				Adj. Area (ft^2):	625
				Adj Volume (yd^3)	103

	Length (m)	Width (m)	Dredge Tailings Totals	
Pile #1	5.1	3.7	Area: (m^2):	95
Pile #2	10.7	7.1	Adjusted Area (m^2):	76
	15.8	10.8	Adj. Area (ft^2):	816



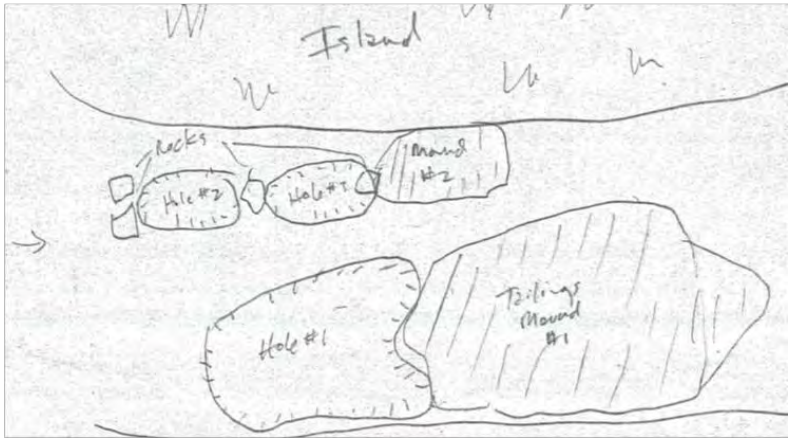


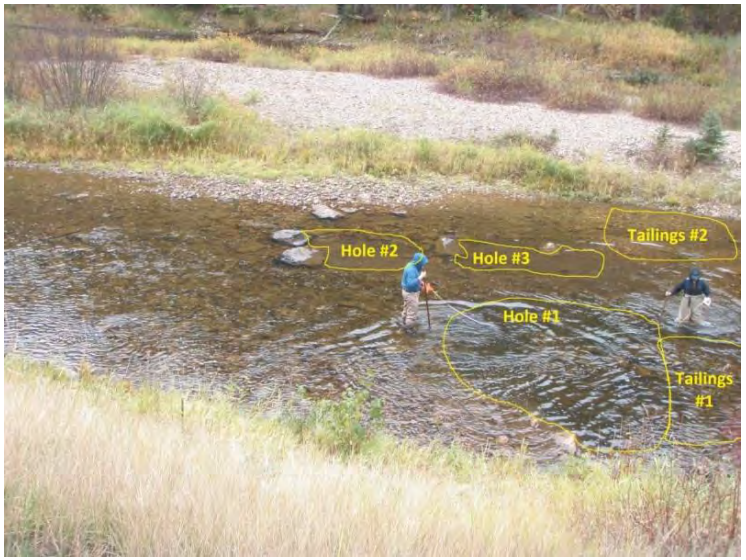
SFCR Unauthorized Site #4, October 7, 2015

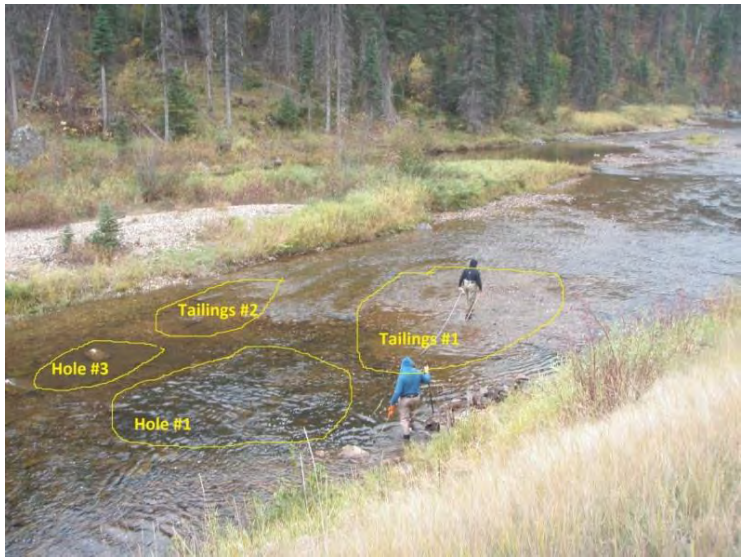
Upper feature location	Hughes Site?	Dredge Fines?	WPM?	Notes:
UTM 11 610459E, 5076104N	4	Yes	No	n/a

	Length (m)	Width (m)	Depth (m)	Dredge Hole Totals	
Hole #1	6.7	7.2	1.3	Area: (m^2):	61
Hole #2	2.9	2.6	0.3	Adjusted Area (m^2):	49
Hole #3	2.7	2	0.4	Adj. Area (ft^2):	527
				Adj Volume (yd^3)	51

	Length (m)	Width (m)	Dredge Tailings Totals	
Pile #1	8.1	12.5	Area: (m^2):	118
Pile #2	3.3	5	Adjusted Area (m^2):	94
	11.4	17.5	Adj. Area (ft^2):	1014





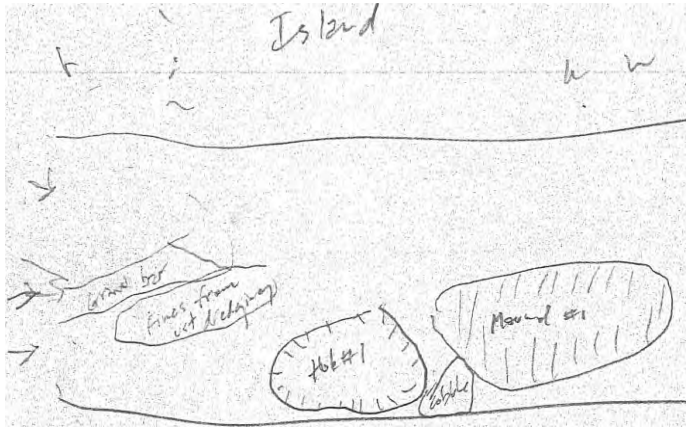


SFCR Unauthorized Site #5, October 7, 2015

Upper feature location	Hughes Site?	Dredge Fines?	WPM?	Notes:
n/a	4	Yes	No	n/a

	Length (m)	Width (m)	Depth (m)	Dredge Hole Totals	
Hole #1	3.6	3.2	1	Area: (m^2):	12
				Adjusted Area (m^2):	9
				Adj. Area (ft^2):	99
				Adj Volume (yd^3)	8

	Length (m)	Width (m)	Dredge Tailings Totals	
Pile #1	4.7	7.1	Area: (m^2):	33
	4.7	7.1	Adjusted Area (m^2):	27
			Adj. Area (ft^2):	287

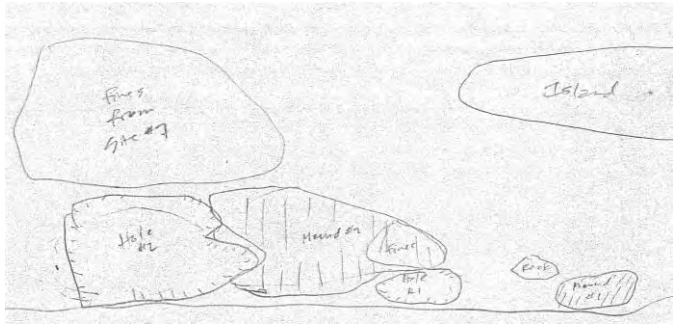


SFCR Unauthorized Site #6, October 7, 2015

Upper feature location	Hughes Site?	Dredge Fines?	WPM?	Notes:
UTM 11 610548E, 5076093N	5	Yes	No	Fines accumulations up to about 4" in depth

	Length (m)	Width (m)	Depth (m)	Dredge Hole Totals	
Hole #1	2	2.8	1	Area: (m^2):	75
Hole #2	9.5	7.3	1.4	Adjusted Area (m^2):	60
				Adj. Area (ft^2):	645
				Adj Volume (yd^3)	84

	Length (m)	Width (m)	Dredge Tailings Totals	
Pile #1	2.2	3.5	Area: (m^2):	203
Pile #2	13.3	14.7	Adjusted Area (m^2):	163
	15.5	18.2	Adj. Area (ft^2):	1749

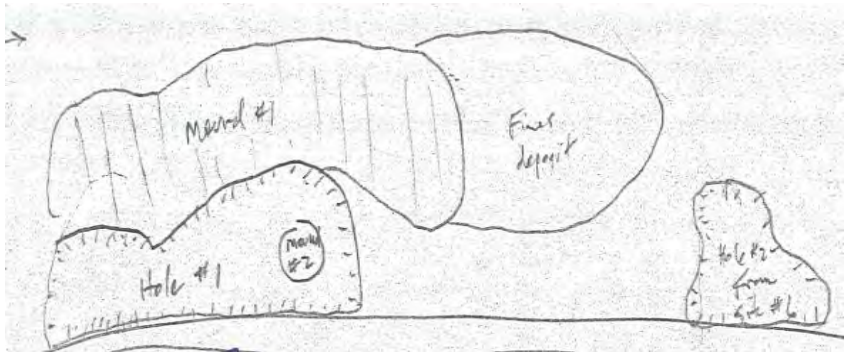


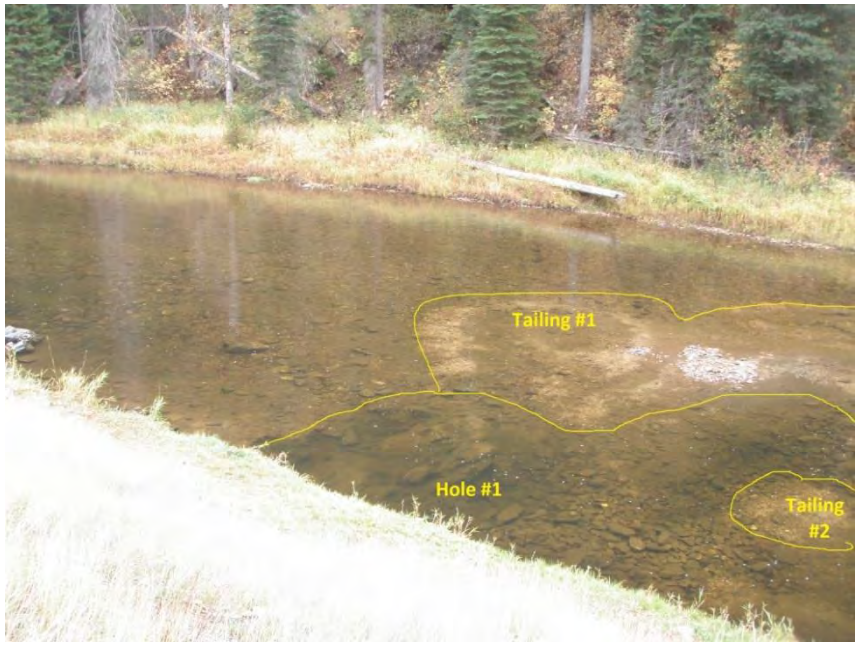
SFCR Unauthorized Site #7, October 7, 2015

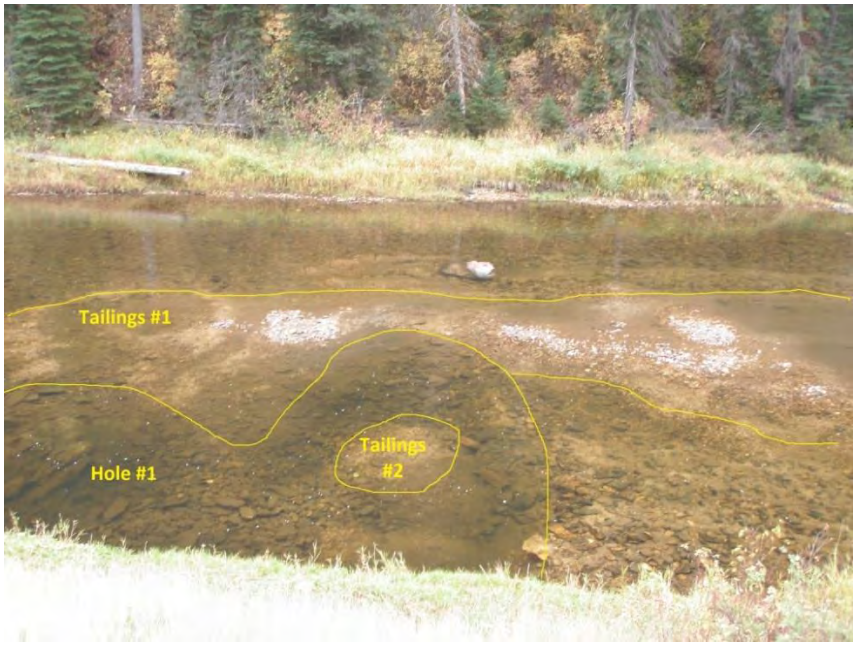
Upper feature location	Hughes Site?	Dredge Fines?	WPM?	Notes:
UTM 11 610574E, 5076090N	5	Yes	Yes	Bank undercut for most of length of Hole #1, fines up to 2"

	Length (m)	Width (m)	Depth (m)	Dredge Hole Totals	
Hole #1	9.7	12.5	1.3	Area: (m^2):	121
				Adjusted Area (m^2):	97
				Adj. Area (ft^2):	1044
				Adj Volume (yd^3)	127

	Length (m)	Width (m)	Dredge Tailings Totals	
Pile #1	11.1	14.9	Area: (m^2):	169
Pile #2	2.3	1.7	Adjusted Area (m^2):	135
	13.4	16.6	Adj. Area (ft^2):	1457





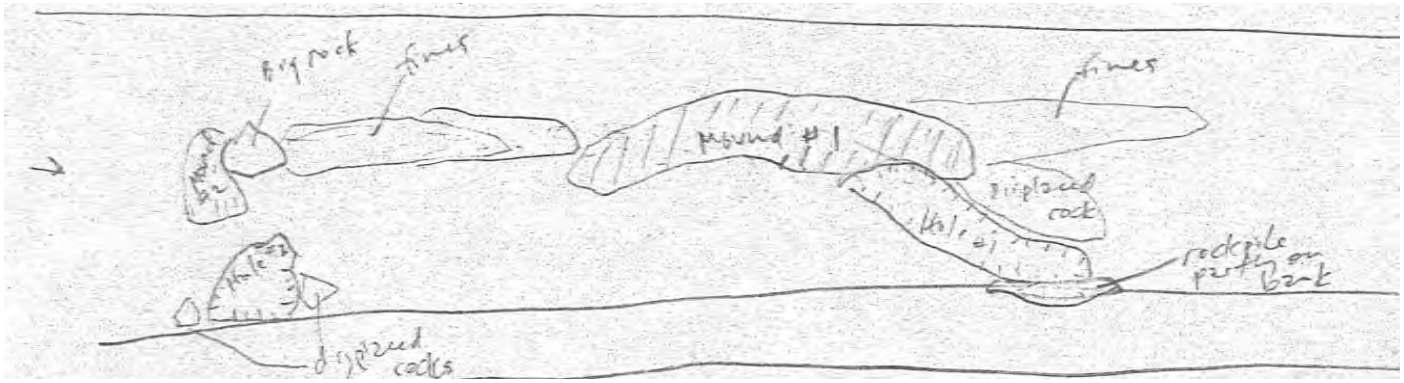


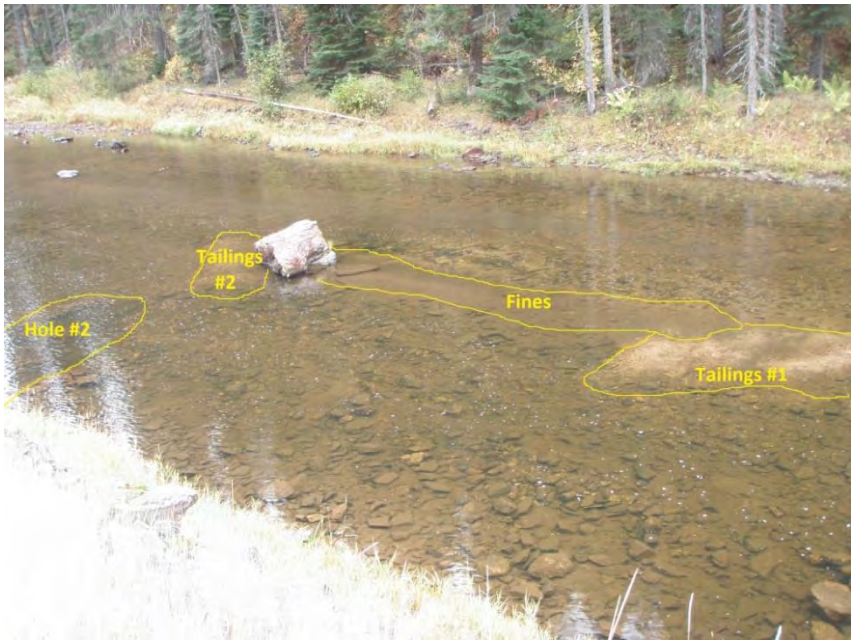
SFCR Unauthorized Site #8, October 7, 2015

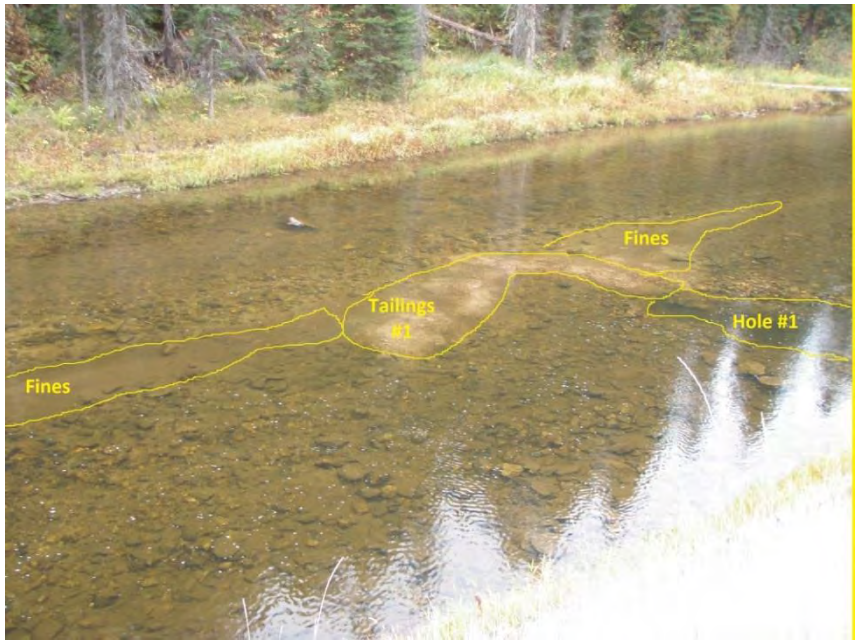
Upper feature location	Hughes Site?	Dredge Fines?	WPM?	Notes:
UTM 11 610645E, 5076084N	5	Yes	No	n/a

	Length (m)	Width (m)	Depth (m)	Dredge Hole Totals	
Hole #1	7.5	6.3	1.5	Area: (m^2):	72
Hole #2	6	4.1	1	Adjusted Area (m^2):	57
				Adj. Area (ft^2):	618
				Adj Volume (yd^3)	77

	Length (m)	Width (m)	Dredge Tailings Totals	
Pile #1	5.3	10.1	Area: (m^2):	66
Pile #2	4.3	3	Adjusted Area (m^2):	53
	9.6	13.1	Adj. Area (ft^2):	572





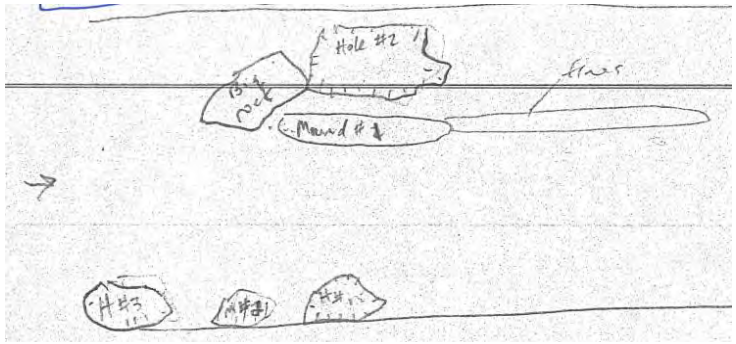


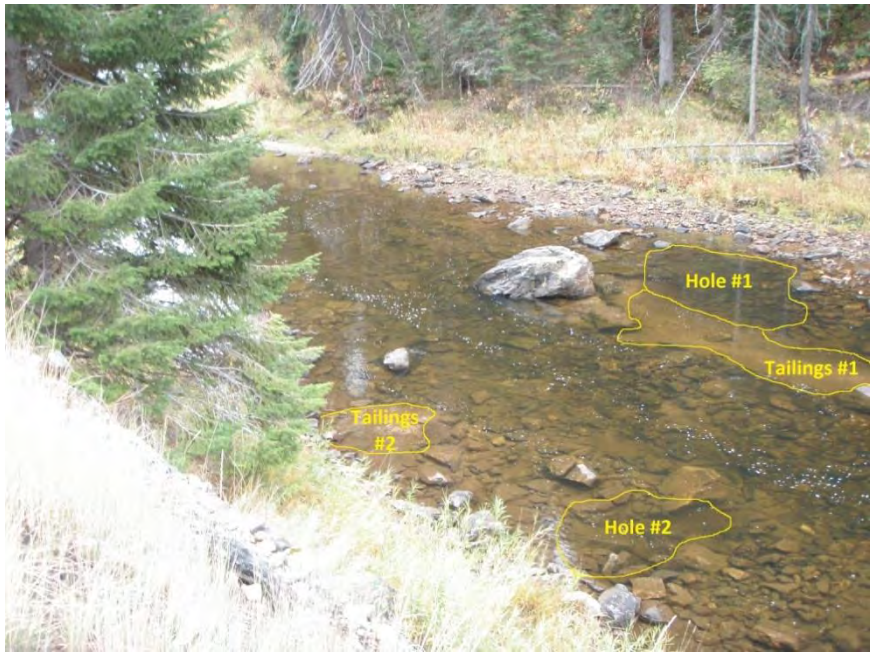
SFCR Unauthorized Site #9, October 7, 2015

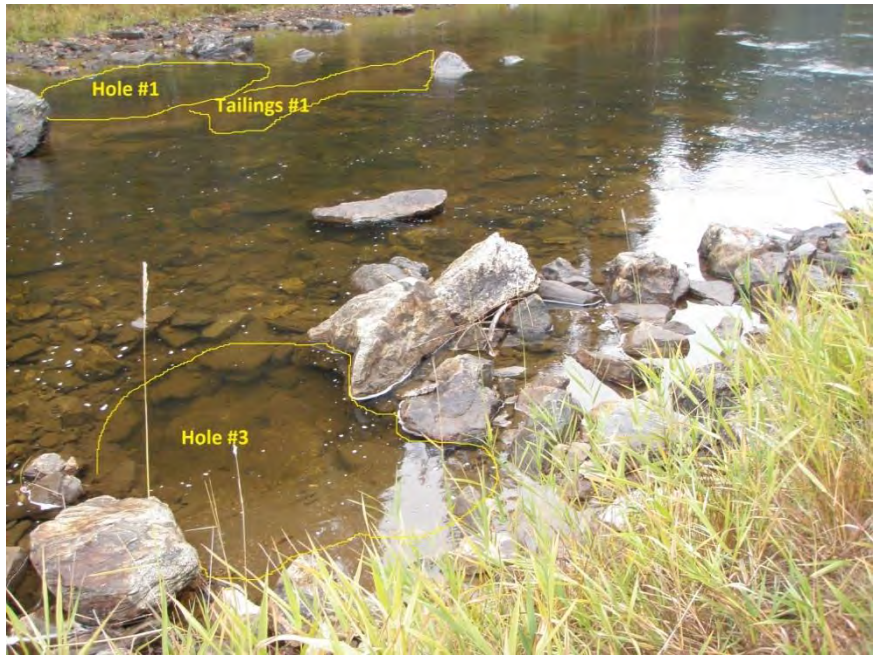
Upper feature location	Hughes Site?	Dredge Fines?	WPM?	Notes:
UTM 11 610700E, 5076075N	6	Yes	Yes	n/a

	Length (m)	Width (m)	Depth (m)	Dredge Hole Totals	
Hole #1	6.3	4.7	0.9	Area: (m^2):	73
Hole #2	5.4	7.5	1.3	Adjusted Area (m^2):	58
Hole #3	1.8	1.6	0.7	Adj. Area (ft^2):	628
				Adj Volume (yd^3)	62

	Length (m)	Width (m)	Dredge Tailings Totals	
Pile #1	1.7	27.7	Area: (m^2):	49
Pile #2	1.6	1.5	Adjusted Area (m^2):	40
	3.3	29.2	Adj. Area (ft^2):	426





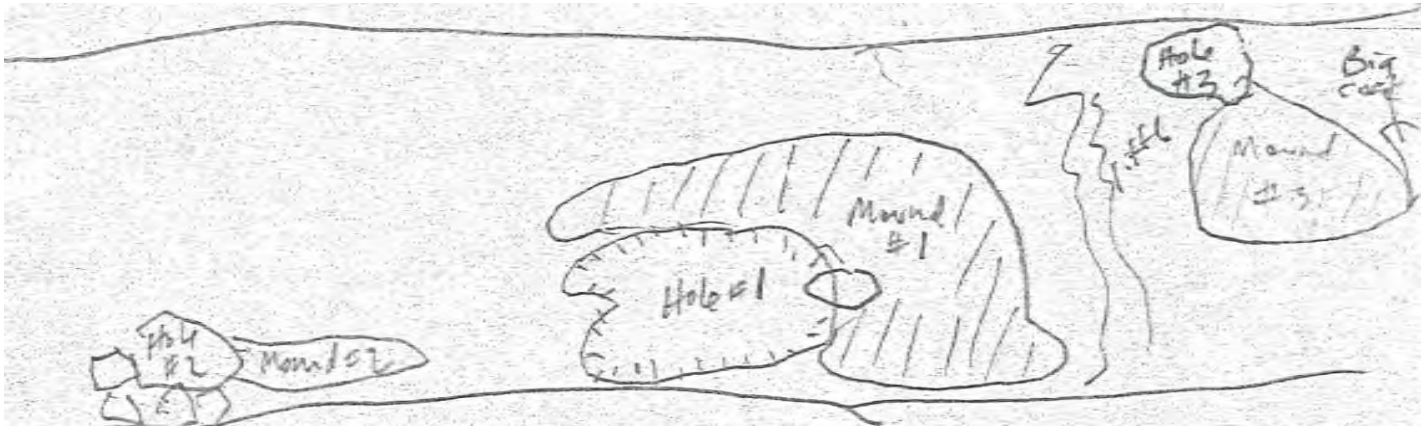


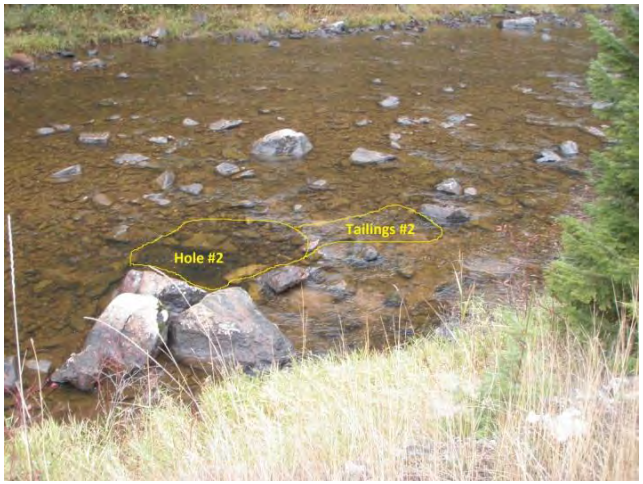
SFCR Unauthorized Site #10, October 7, 2015

Upper feature location	Hughes Site?	Dredge Fines?	WPM?	Notes:
UTM 11 610739E, 5076048N	6	Yes	Yes	n/a

	Length (m)	Width (m)	Depth (m)	Dredge Hole Totals	
Hole #1	7.2	7.1	1.9	Area: (m^2):	96
Hole #2	3.2	3.3	0.9	Adjusted Area (m^2):	77
Hole #3	5.7	6.1	1.3	Adj. Area (ft^2):	830
				Adj Volume (yd^3)	129

	Length (m)	Width (m)	Dredge Tailings Totals	
Pile #1	13.4	16	Area: (m^2):	285
Pile #2	3.5	14	Adjusted Area (m^2):	228
Pile #3	5	4.3	Adj. Area (ft^2):	2452



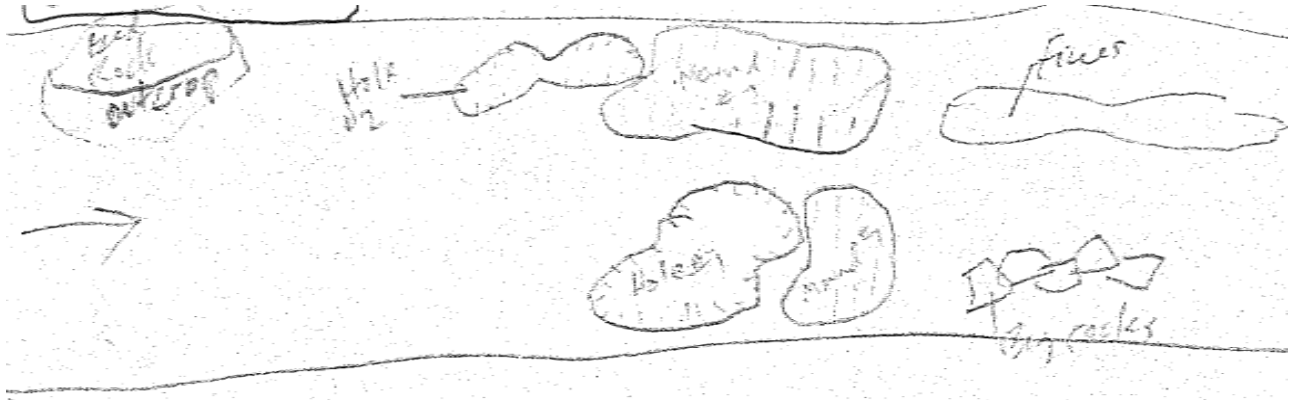


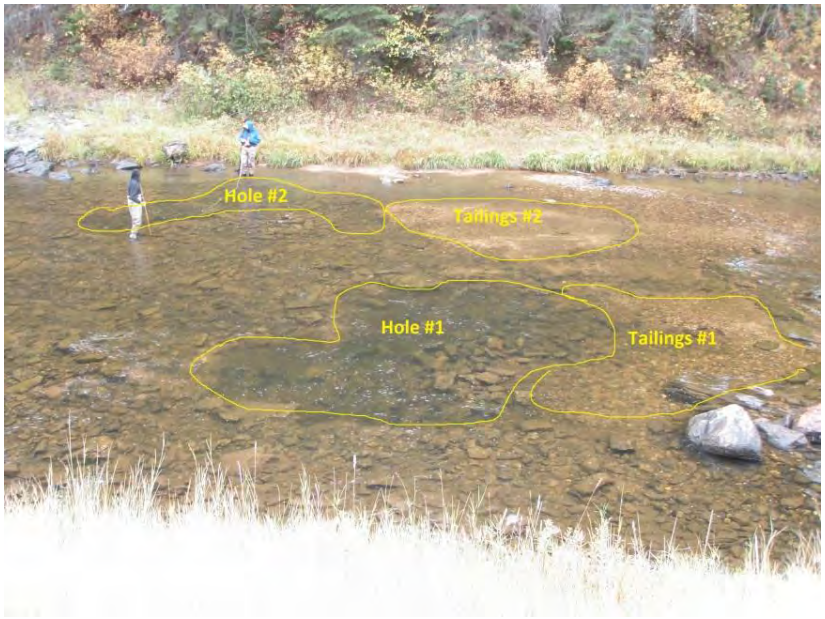
SFCR Unauthorized Site #11, October 7, 2015

Upper feature location	Hughes Site?	Dredge Fines?	WPM?	Notes:
UTM 11 610918E, 5075883N	n/a	Yes	Yes	Fines accumulations up to about 6" in depth

	Length (m)	Width (m)	Depth (m)	Dredge Hole Totals	
Hole #1	5.6	6	1.3	Area: (m^2):	61
Hole #2	5.5	5	1	Adjusted Area (m^2):	49
				Adj. Area (ft^2):	526
				Adj Volume (yd^3)	55

	Length (m)	Width (m)	Dredge Tailings Totals	
Pile #1	4.6	4.6	Area: (m^2):	114
Pile #2	7.7	12	Adjusted Area (m^2):	91
			Adj. Area (ft^2):	978



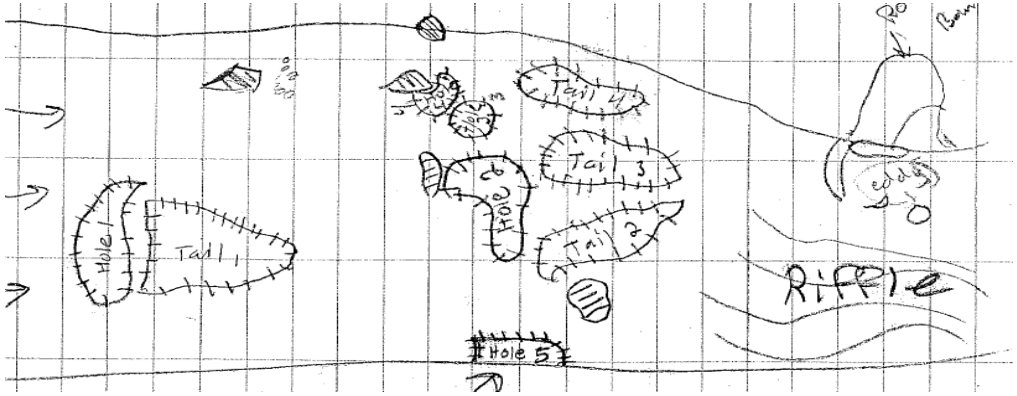


SFCR Unauthorized Site #12, October 8, 2015

Upper feature location	Hughes Site?	Dredge Fines?	WPM?	Notes:
UTM 11 614062E, 5075540N	8	No	No	Bank undercut for portion of length of Hole #5

	Length (m)	Width (m)	Depth (m)	Dredge Hole Totals	
Hole #1	5.3	5	1	Area: (m^2):	78
Hole #2	5.7	5.2	0.9	Adjusted Area (m^2):	62
Hole #3	1.6	3.8	0.7	Adj. Area (ft^2):	670
Hole #4	4.3	2.7	0.8	Adj Volume (yd^3)	47
Hole #5	2.7	1.5	0.5		

	Length (m)	Width (m)	Dredge Tailings Totals	
Pile #1	10.5	4	Area: (m^2):	135
Pile #2	7.8	2.2	Adjusted Area (m^2):	108
Pile #3	9.9	4.7	Adj. Area (ft^2):	1161
Pile #4	7.9	3.7		

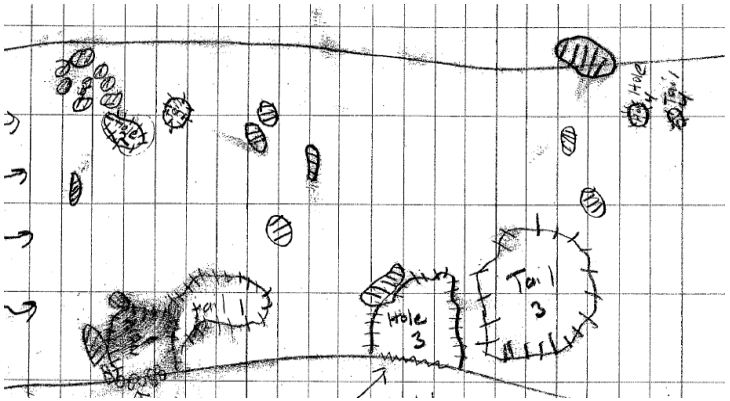


SFCR Unauthorized Site #13, October 8, 2015

Upper feature location	Hughes Site?	Dredge Fines?	WPM?	Notes:
UTM 11 613792E, 5075546N	7	No	Yes	n/a

	Length (m)	Width (m)	Depth (m)	Dredge Hole Totals	
Hole #1	3.1	3.9	1.8	Area: (m^2):	53
Hole #2	2.4	2.7	0.9	Adjusted Area (m^2):	42
Hole #3	5.5	5.9	1.8	Adj. Area (ft^2):	453
Hole #4	1.6	1	0.8	Adj Volume (yd^3)	75

	Length (m)	Width (m)	Dredge Tailings Totals	
Pile #1	2.9	3.4	Area: (m^2):	46
Pile #2	1.6	1.4	Adjusted Area (m^2):	37
Pile #3	6.2	4.8	Adj. Area (ft^2):	393
Pile #4	1.9	2		

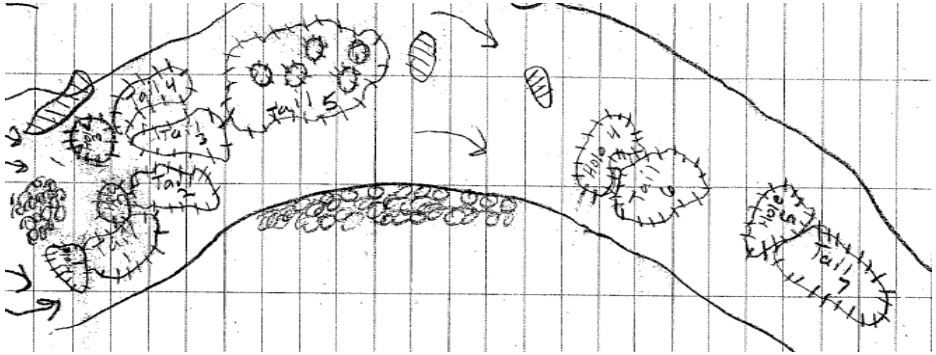


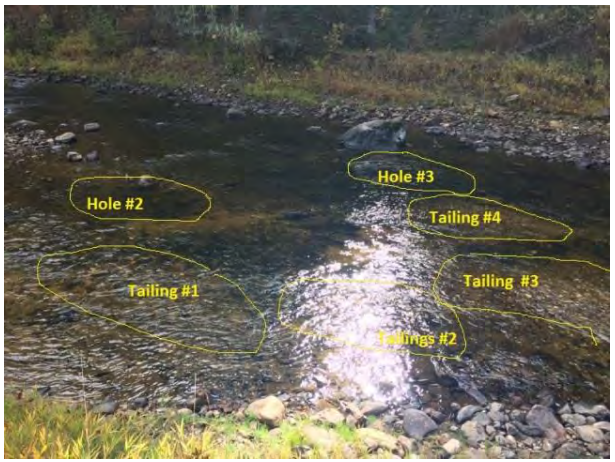
SFCR Unauthorized Site #14, October 8, 2015

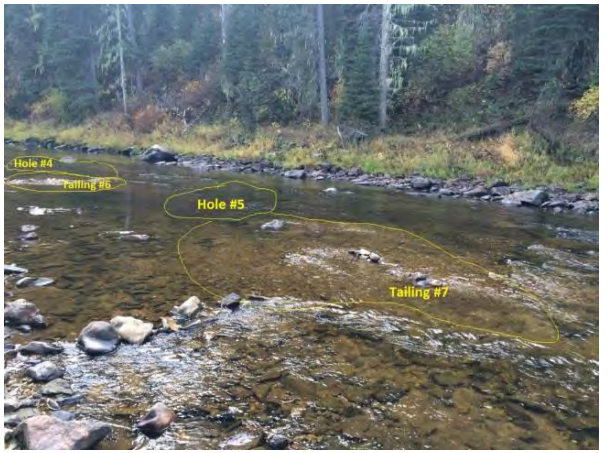
Upper feature location	Hughes Site?	Dredge Fines?	WPM?	Notes:
UTM 11 609175E, 5075244N	2	No	No	Some dredge holes/tailings intersperse/indistinct

	Length (m)	Width (m)	Depth (m)	Dredge Hole Totals	
Hole #1	10.4	4.9	0.7	Area: (m^2):	146
Hole #2	3.5	3.1	0.7	Adjusted Area (m^2):	116
Hole #3	3.8	2.6	0.6	Adj. Area (ft^2):	1253
Hole #4	6.3	7.9	1	Adj Volume (yd^3)	86
Hole #5	5.6	4.3	1.1		

	Length (m)	Width (m)	Dredge Tailings Totals	
Pile #1	3.6	2.2	Area: (m^2):	234
Pile #2	5.3	3.9	Adjusted Area (m^2):	187
Pile #3	6.8	2.6	Adj. Area (ft^2):	2017
Pile #4	6.2	2.1		
Pile #5	17.6	4		
Pile #6	6.7	6.3		
Pile #7	8	7.8		







Appendix B.

Comparison of 7 selected pairs of photos from Hughes (2015) July inspection with Kenney (this document) October inspection.

Photos are paired side by side, with July photo on left, and October photo on right.

Note that a star on or above rock or other landscape feature indicates the same point on each pair of photos and that the location and angle of each photo is usually different that the photo with which it is paired.


Hughes Site #3;
Kenney Site #2


Hughes Site #3;
Kenney Site #2


Hughes Site #4;
Kenney Site #3


Hughes Site #4;
Kenney Site #3

CX_001521


Hughes Site #5;
Kenney Site #7


Hughes Site #5;
Kenney Site #7


Hughes Site #6;
Kenney Site #10


Hughes Site #6;
Kenney Site #10


Hughes Site #2;
Kenney Site #14


Hughes Site #2;
Kenney Site #14


Hughes Site #2;
Kenney Site #14


Hughes Site #2;
Kenney Site #14